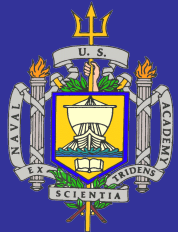




Risk Management in Sailing



Prof. Paul H. Miller, D.Eng., P.E.
Naval Architecture Program
United States Naval Academy



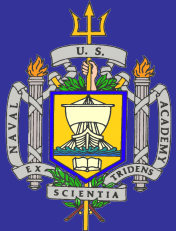
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Goals

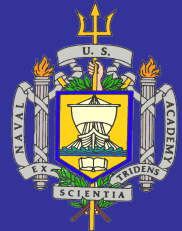
- 1. To get sailors thinking about how risky sailing is**
- 2. To identify the major risk factors in sailing**
- 3. To assess risk and manage it**
- 4. To think through a risk management scenario**





What is Bad Risk Management?

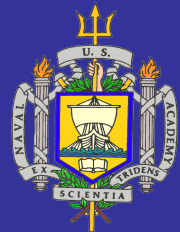
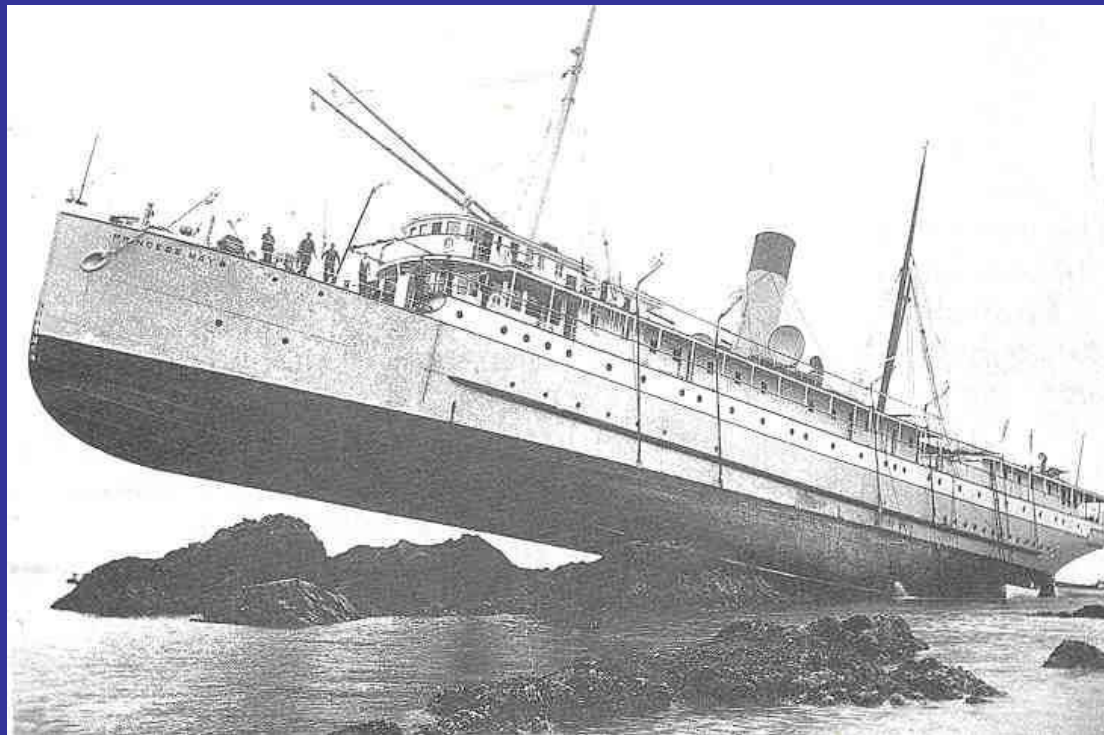
- Letting something surprise you because you were not prepared!



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Another Bad Example!



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And Another!



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How Risky Is Sailing*?

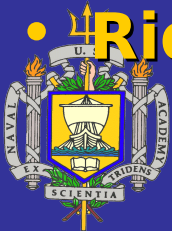
*All types, as reported in CDC and USCG statistics (2001-2002)

• Sailing Risk is 0.03 fatalities per 100,000 participants normalized to average hours of participation per participant

Sailing is less risky than... And is more risky than.

- Riding in a car (30)
- SCUBA diving (2)
- Flying in a small plane or commercial aviation (1 or 0.04)
- Cheerleading (0.4)
- Canoeing (0.12)
- Riding a bike (0.09)
- Riding a PWC (0.06)
- Walking to work (0.025)
- Riding the Bus (0.02)
- Riding a Ferry (0.01)
- Riding a Train (0.01)
- Riding a Horse (0.01)
- Cabin motorboats (0.0002)
- “Ocean Racing” is 0.35 (U)

Note: take these, like all, statistics with a grain of salt!



Injuries to Fatalities Ratio

(requiring professional medical assistance)

- Football = 65,000 injuries/fatality
- Golf = 33,000
- Sailing = 200
- Caving/Rock Climbing = 16
- Aviation = 2





What is “Risk”?

- It is clearly associated with both the likelihood of the event occurring,

• **And the severity of the consequence**

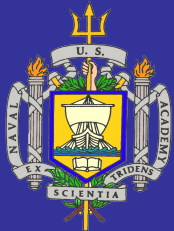
$$\text{Risk} = \text{Probability of Occurrence} \times$$

Cost of Event's Occurrence

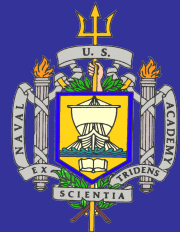
A simple example:

Which carries more risk?

A broken batten or a broken rudder?



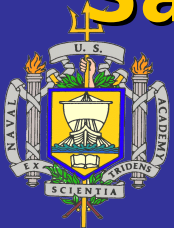
**The Supreme Court noted
that,
“all activities have risk...
safe does not mean the
a**





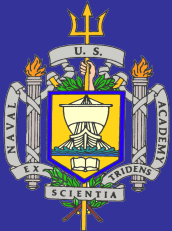
Current Risk Philosophy

- If the fatality rate is greater than 1/100,000
- Or, the cost is greater than about \$5,000
- Then insurance companies believe it is “risky” and require special policies or premiums.
- “Society” has similar values, but yours may be different!
- Sailing is a gray area!



What is “Safety”?

- **The Reduction of Risk by either reducing the likelihood of occurrence or the cost of consequence.**
- **Examples:**
 - **Avoiding stormy locations (lower loads)**
 - **Redundancy (spares)**
 - **Choosing the correct time to reef**
 - **Inspecting your rig**

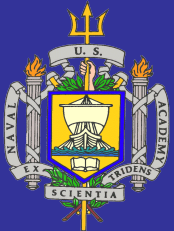
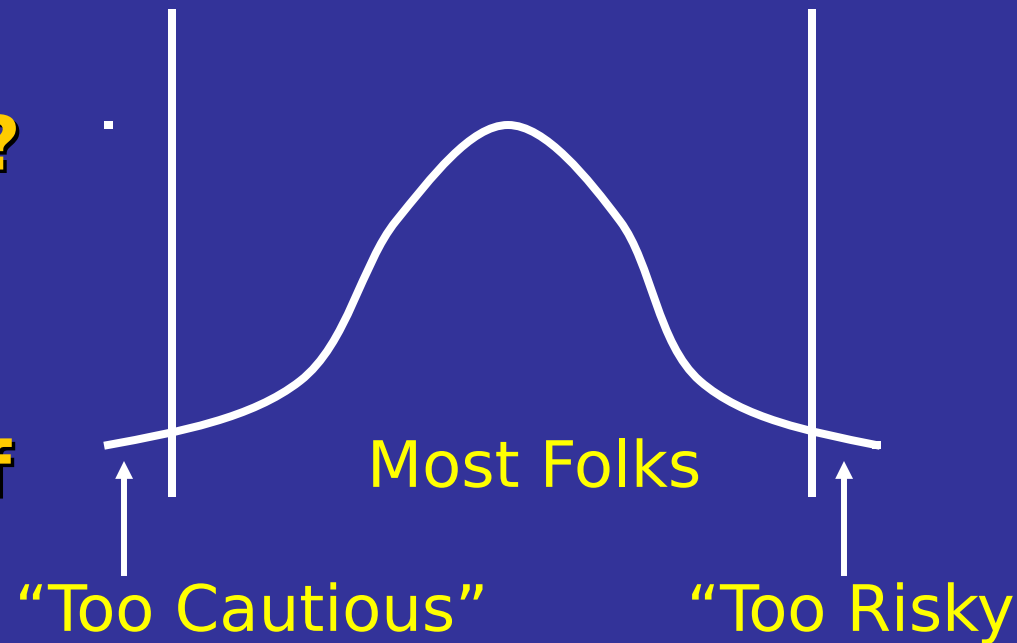




Everyday Risk

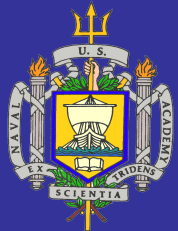
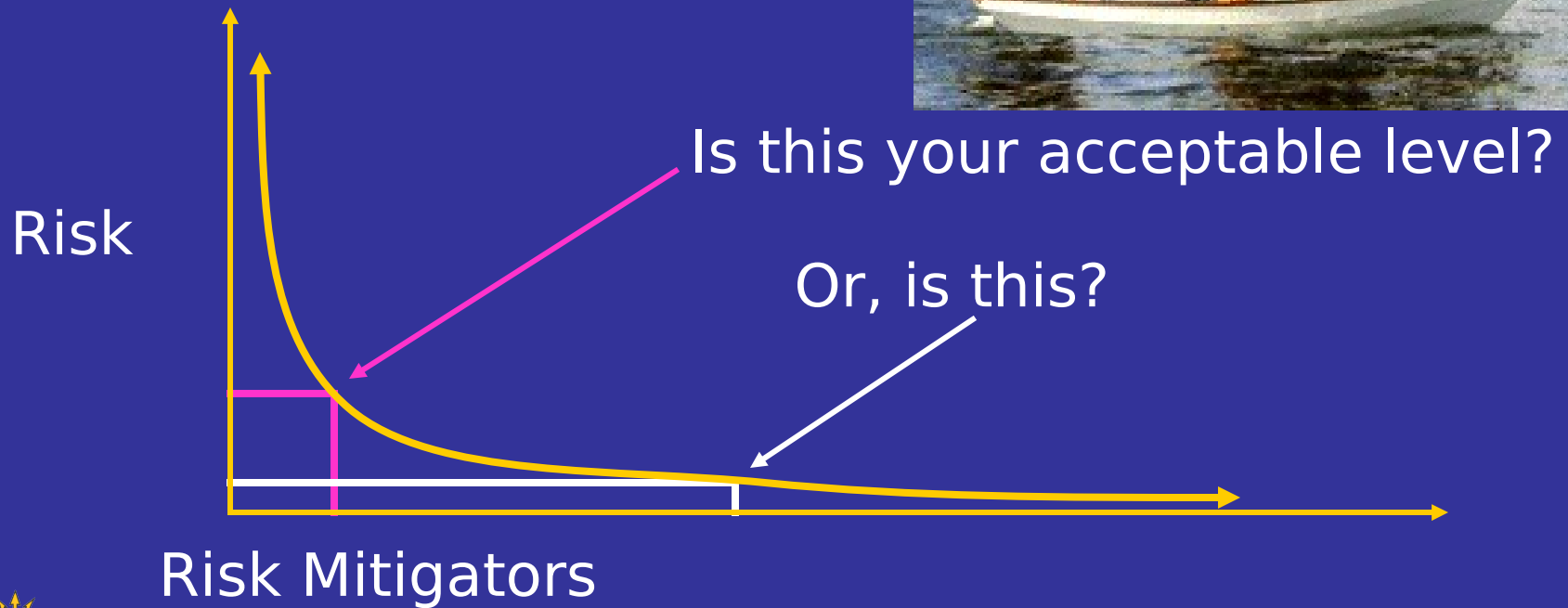
Do you consider yourself a “risk taker”?
The “attitude factor”!

- Skydiver?
- Motorcycle rider?
- Smoker?
- Cell phone user?
- Cross the path of a black cat?





How Much Risk Will You (Personally!) Accept?





Risk Mitigators in Sailing

- **Boating Education**
- **Boating Experience**
- **Preparation (equipment condition and expertise)**
- **Attitude**

**Most mitigators focus on the crew, not the equipment
89% of recreational marine accidents are operator error**



More USCG Statistics

Boating Education

- **Boaters who took a boating education class in the last three years were 466 times less likely to be involved in an accident!**





Boating Experience

- **Boaters with less than 100 hours experience were twice as likely to have an accident as those with 100-500 hours and were 30,000 times more likely to have an accident than those with greater than 500 hours!**
- **An average (US) boater accumulates about 240 hours per year. (MD is about 150 hours.)**



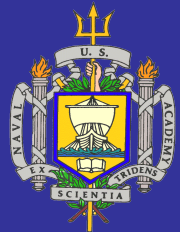


The Big 5 Risks in Sailing

Requiring Medical Attention

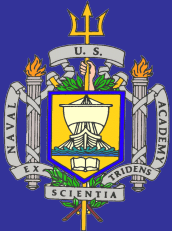
(USCG 2001)

- 1. Collision 62%**
- 2. Grounding 9%**
- 3. Capsize 8%**
- 4. Fall Overboard 4%**
- 5. Fire 4%**



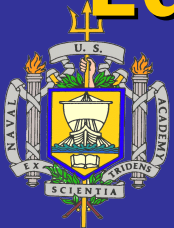
Four Steps to Managing Risk

1. Assess Overall Risk
2. Assess Increased Risk
3. Identify Risk vs Reward
4. Reduce or Accept Risk



Basic Sailing Risk

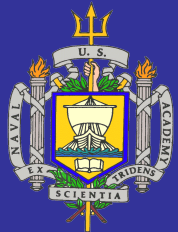
- **A nice day**
 - Light to moderate winds
 - Water above 60 degrees
 - Boat in good condition
 - Regular crew
 - Local area
- **Equals LOW RISK!**





Increased Risks

- **Heavy Weather**
- **Crew (experience, familiarity with boat and each other, physical condition)**
- **Equipment (have it, it works, and the crew knows how to)**
- **Racing (pushing the limit)**
- **“Get home-itis”**



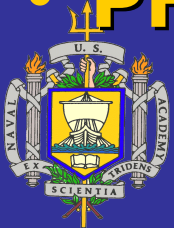
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Example Risk Management Case

Beer Can Race in Annapolis in August

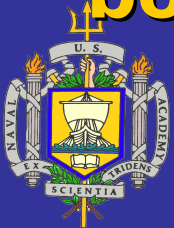
- Winds ~6 kts, ~80 deg
- Doublehanded
- TS warning
- TS cell seen approaching
- PFDs put on





Example Risk Management Case

- Jib and mizzen dropped, main reefed
- Other boats dropped sails, used OB, headed in
- Hove-to through 50-72 knot breeze
- Resumed race & won!
- Noticed grounded boats on the way in.



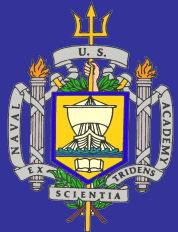


An Exercise in Risk Mgt!

Based on a true story.
The names have been changed...



- **First race/second sail of the season (mid-April) (first sail in 5 kts)**
- **Forecast from day before is for 10-15 with slowly falling temp, cloudy and wind going to the NW from NE**
- **First doublehanded race!**
- **Crew arrives and complains about hangover**
- **Assess and Manage?**

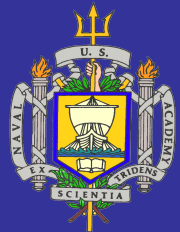




An Exercise in Risk Mgt!



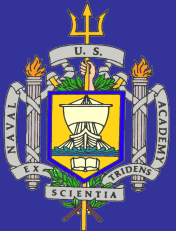
- **Arrive at the start. Wind is 13-16. Radio and cell phones inop.**
- **Choose #3 due to stability & visibility.**
- **Around leeward mark the starboard jib lead breaks. Quickly tacks.**
- **Jib Change to #1?**
- **Assess and Manage?**





An Exercise in Risk Mgt!

- PFD on, #1 goes up, crew back on rail.
- Coming in on port layline...
- “Starboard!”
- Quick tack & splash!
- Singlehanded recovery. Crew goes below to change.
- Assess and Manage?





Final Thoughts

- **Sailing does not have to be very risky.**
- **Sailing risks can change rapidly and must be constantly assessed.**
- **Know that collisions, grounding, capsizing, falling overboard and fires are the most common problems.**
- **Education and Experience (& practice!) are strong mitigators of risk.**



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